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ABSTRACT

To examine the effectiveness of various writing devices, a study used Richard Carter's Signalled Stopping Technique (SST) to compare these devices as used in two student-authored science stories. The SST indicates how messages are mentally processed, and uses the following seven stops: (1) C (confusion); (2) R (reread); (3) Q (question); (4) T (think about the idea); (5) U (sudden insight or understanding); (6) A (agree) and (7) B (disagree). The first five stops are related to different developmental cognitive strategies, including comprehension strategy, imitation strategy, and questioning strategy. The two stories covered interviews with scientists on campus. Students in two public relations courses read the stories for stops. Both stories were written with figures of speech and other literary devices, and no significant differences between stops were predicted. However, findings indicated that one of the stories was more featuristic, more elaborated with devices, than the other. Although there were no significant differences for question, think, and understand stops, significant differences existed for reread and confused stops. (One table of data is included.) (MM)

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Signalled Stopping In Two Science Stories

Generally, we advise students in Magazine Article and Science Writing classes to utilize feature leads and other literary devices to increase readership, to spur the imaginations of readers, and, ideally, to increase readers' understanding of the topic. Burkett (1986) provides comprehensive explanations of the more useful literary devices available to writers: scene setting, anecdotes, metaphor, simile and analogy; other devices may include use of examples, personification, if properly done, and personalizing the scientist source for the reader.

As teachers, we have advised use of stylistic devices as stimuli to imagination and thought without too much submitting such devices to rigorous testing; intuitively, we seemed to know such devices had certain effects; and, we stood on sure traditional ground, for they were the stuff and substance of literature. We are beginning to think about testing the effectiveness of some of these writing devices, however, and to compare them for effects. Burkett notes that Bostian showed that even college students read stories faster and find the subjects

more interesting when written in the active voice. Less literate readers appeared to appreciate active writing even more.

In a few studies over the last three years, I tested writing devices in Public Relations messages utilizing Carter's Signalled Stopping Technique (1973). In these earlier SST studies, two sets of stories were distributed randomly within the study population, one set containing examples and analogies, and the other story alike except for deletion of the figures of speech. In the present study, however, two articles written by students in a Science Writing class were tested over students in different classes using the SST. This was meant as a kind of check on teaching: I wished to see what might be the result if stories written by students taught in use of the devices and in certain axiomatic principles (Grunig etal, 1985) were tested for signalled stops. I wondered if stories produced more like they would be under normal conditions would produce different patterns for stops.

THEORETICAL CONCEPTS

When we developed the axiomatic theory of language and cognition, we outlined several conceptual works bearing upon the axiomatic principles themselves. I will not repeat them here; what I would like to do, however, is

something we did not do in that seminal work, and that is to suggest conceptual bridges between the signalled stops and developmental cognitive psychology, which also anchors much of the axiomatic theory. The Signalled Stopping Technique provides a useful feedback framework for the testing of messages because it indicates how messages are mentally processed. Conveniently, five to seven stops are usually used:

C = Because of confusion...The person stops or pauses because they feel they have lost the idea the writer is striving to communicate.

R = To reread...The person stops and goes back over previous parts of the message either to get back on track or to enhance understanding of the material.

Q = To ask a question...The person stops because a question forms in the mind, a question the reader wishes he or she could ask the writer for clarification.

T = To think about the idea...The reader stops to "mull" over what has been read and to try to put it all together; another term in some study areas for this stop might be "rehearsal."

U = Because of sudden insight or understanding...The person stops because he or she does understand the "main idea" the writer has been trying to convey and wishes to

"let it sink in."

And sometimes,

A = To agree...The reader agrees with the idea in the message or story.

B = To disagree...The reader disagrees with the idea in the message.

Also, in some cases, readers are asked to write in other reasons for their stopping behavior.

How do these relate to developmental cognitive psychology? Generally, new development of schemata and cognitive structures seems to proceed along the line of match and imprint: as Nelson (1973, a), Piaget (1926), others, have proposed, the child and the adult proceed with language and concept development by being active processors of sensory input. Individuals process on the basis of certain "hypotheses" about how the world works, how it has worked for them, how they stored impressions of this activity. New experiences and concepts are then tested by these individuals against already stored impressions and concepts for cognitive "match." What gets stored in long-term memory are lexical classes for objects and ideas or concepts carried in cognitive coding. Certain textual devices can help decrease dissimilarity between textual coding and cognitive codes. Thus they

assist in clarifying the topic (Anderson, 1980; Palermo, 1978).

The child as well as the adult seeks correspondence between what is known and what is not known in the effort to encode and react to the world. Because experience is stored in long-term memory in "domains," memory is enhanced when a familiar domain is introduced before an unfamiliar addition is about to be suggested; in this way, the learner may conduct an adequate "search," achieve correspondence, and then add to conceptual domain or schemata regarding the topic.

Nelson (1973, b) studied six different strategies in language acquisition among children up to 2 years of age. The first--functional definition of language--seemed to discriminate between individuals; the other five strategies appeared to be useful in describing language acquisition over all children. Therefore, it is these five strategies that appear to form the bridge for signalled stops.

COMPREHENSION STRATEGY. (Relating this to the "u" stop for "understanding.") Nelson defined comprehension as responding appropriately to others' utterances; she found that young children responded better to naturally formed sentences. Since responding correlated with the

other indices of language development, Nelson assumed a more efficient strategy in language processing in some children. Nelson's "comprehension strategy" can be related to the signalled stop "understanding" as it is defined for the exercise--subjects are instructed to mark the "u" stop when they experience insight into a passage of text. From our experience, students use the "u" stop in the following ways:

a) to indicate stages of processing uninterrupted by rereading, questioning, or confusion;

b) to indicate insight into a passage following rereading;

c) to indicate comprehension of the entire text, as if giving a sign that, having processed the symbols, they now comprehend them.

I'm not at all sure all students distinguish adequately between the "u" and the "t" stops; but I'm convinced that most can do so. We see a pattern emerge for the majority of students, where more difficult passages elicit an "r", then perhaps a "t", and, finally, a "u." Students clearly seem capable of distinguishing the "u" stop from the other three stops, "r", "q", and "c."

PRODUCTION STRATEGY. (Related to the signalled stop

"t" for "thinking.") Nelson related the amount of talking in young children in a play situation to other indices of language acquisition, suggesting the efficacy of the "original word game" where children use words as signposts for learning more about their environments. In other words, they use words as labels to help them "think"--to discriminate between objects and conditions. Thus the "thinking" signalled stop would seem clearly related to the earlier production stage. Even in adults, some researchers have shown clearly how written text is physiologically "mimicked" within the vocal cords and larynx as the reader proceeds.

Most students seem capable of correctly using the "t" stop, that is, registering "think" when they appear to be marking certain propositions in the copy, indicating some type of mental search. Most who use the "t" also use "r" stops appropriately and usually follow up with the use of a "u" stop.

IMITATION STRATEGY. (Related to signalled stop "c" for "confused.") Nelson's imitation strategy was found to be related to knowledge of the word to be imitated and not to vary with the referent of the word; thus imitation strategy was very closely tied to contextual cues or coding. Nelson found the imitation strategy to be

situationally useful, according to the stage of language development. That is, this strategy appeared to be useful in earlier stages, but not later--if the cue or code was missed at the appropriate time, the strategy did not help the learner so much later. Thus this strategy was environment-dependent.

In the signalled stops, it is suggested that the stop "c" overlap with this imitation strategy. In our studies, students used the "c" stop to indicate the following:

a) a mismatch in schematic and textual elements--for instance, students appear to use "c's" at textual examples they can not relate to experientially;

b) embedded contextualizations--some students use "c's" to express confusion when the language in the text appears to be "hiding" as much as it reveals, as in use of irony.

Overall, the "c" stop seems pretty well distinguished from the other stops; there seems to be clear indication of lack of contextual signposts for the markers when this stop occurs. Because of this, this stop appears to be audience-dependent; as a feedback mechanism, it seems to show that the figures of speech selected by the writer could not be appropriately processed by these students. Perhaps demographics and psychographics would be helpful in the interpretation of such marks.

REPETITION STRATEGY. (Related to the signalled stop "r" for "reread.") Nelson suggested that repetition of words and sentences by young children was a useful strategy up to the point the children began to match words and concepts in order to produce language themselves--at that point, the strategy became somewhat less useful. Nelson believed that repetition strategy in language processing probably served adults in similar fashion. Mental processing of prototypes, images and words, according to Nelson, can be viewed as part of the individual's attempt to make stable and discrete an inherently transient and continuous experience.

The reread stop is a test for redundancy in the message. There may be too much redundancy, as in elaboration that does not quite come off, or there may be too little redundancy, as in passively written stories. While "r" stops for rereading in copy indicate a lack of correspondence, they should not be regarded as always negative; they sometimes indicate a reader's search for correspondence, which may or may not be achieved. When we ask college students to read stories about complex topics, as we did for this study, we usually see rereading for the following:

a) appropriate rereading by many, as indicated by

followup of marks such as "t" and "u";

b) inappropriate rereading, as indicated by lack of followup marks, or followup with a "c";

c) almost automatic rereading of certain portions in the text, usually followed by a "u".

It is important to look for patterns that develop in students' use of the "r" for rereading. As a feedback mechanism, the "r" stop tells us to look in the copy for structural inconsistencies such as lack of transitions, stacked modifiers, inappropriate figures of speech, and so forth; they also tell us, however, in a positive vein, that rereading preceeded thinking or understanding.

QUESTIONING STRATEGY. Nelson found that more advanced language users among children up to 2 years of age asked more questions. As a strategy, questioning would seem to show maturity and self-confidence in the effort to acquire enough information or sensory input to enable one to form a new cognitive structure or schema where information may be missing. This is exactly the pattern of use that emerged throughout the SST studies: students use the "q" stop to indicate lack of definition or explanation, writers' use of jargon, a lack of attribution, or general lack of clarity. Thus the "q" stop can be useful as a feedback mechanism for stories

where discrete information needs to be added. Apparently, for our studies, students were able to distinquish between proper use of the "r" and the "q" stops: they do not use "r" stops for lack of information, neither do they use "q" stops to stand for the rereading strategy.

Thus, it is in these ways that the five signalled stops seem to be related to developmental cognitive strategies. The present study used the signalled stops in this fashion.

METHODOLOGY

Most of the original stopping exercises were done on brief stories conceived as Public Relations messages, produced in two versions, one with examples and analogies, and one the very same message but without examples and analogies. This particular set of stories was carried throughout several studies. Briefly, what I found was that the version with examples and analogies produced more of all types of stops, in many cases with significant increases in stops for thinking and/or understanding. Based on these studies, I decided to try the stops on stories that were not planned for testing. Thus students in my Science Writing class, at the end of the semester, were treated to two interview sessions with scientists from the campus, and were asked to write stories covering

the interviews. I then took two of these stories, from different writers, and had two different Public Relations classes read them for stops. I had forecast no significant differences between stops for these two stories because they were both written with figures of speech and other literary devices.

FINDINGS

As it turned out, one of the stories was more featuristic, more elaborated with devices, than the other. As data in Table 1 indicate, there were no significant differences for question, think and understand stops, but there were significant differences for reread and confused stops.

(Table 1 about here.)

This pattern turns out to be a kind of "mirror image" of the earlier SST studies where there were never significant differences in "c" stops, but often significant differences in "t" or "u" stops and often for "r" stops (remembering that these studies used two versions where one was devoid of all devices--this was the one in these studies with fewer reread, think and understand stops). The difference in "c" stops in the present study can be partially explained upon examination of the text of the two stories.

TABLE 1: Number of Stops and Reasons for Stopping for Two Groups Reading Two Versions of Science Story on Same Topic

Reason for Stopping	Story No. 1 m	Story No. 1 Standard Deviation	Story No. 2 m	Story No. 2 Standard Deviation	t
Understand	3.18	4.38	2.78	4.13	0.38
Think	1.90	2.06	1.09	1.27	1.88
Reread	4.25	3.27	2.65	1.65	*2.45
Question	1.84	1.83	1.18	1.37	1.61
Confused	1.54	1.52	0.60	0.84	*3.18

N = 32

*p<.05

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